

CLAIMS

1. A foam article comprising a thermoplastic elastomer and having a complete submersion water absorption of less than or equal to $40 \times [(1 - A)/A]$, wherein A= foam density in grams/cubic centimeter,
the foam article being substantially free of a melt strength enhancing additive comprising fluorine.
2. The foam article of claim 1, wherein the complete submersion water absorption is less than or equal to about $25 \times [(1 - A)/A]$.
3. The foam article of claim 1, wherein the complete submersion water absorption is less than or equal to about $10 \times [(1 - A)/A]$.
4. The foam article of claim 1, wherein the complete submersion water absorption is less than or equal to about $5 \times [(1 - A)/A]$.
5. The foam article of claim 1, wherein the foam density is between about 0.30 grams/cubic centimeter and about 0.70 grams/cubic centimeter.
6. The foam article of claim 5, wherein the complete submersion water absorption is less than about 35 percent.
7. The foam article of claim 5, wherein the complete submersion water absorption is less than about 5 percent.
8. The foam article of claim 1, wherein the foam density is between about 0.35 grams/cubic centimeter and about 0.60 grams/cubic centimeter.
9. The foam article of claim 8, wherein the complete submersion water absorption is less than about 35 percent.
10. The foam article of claim 8, wherein the complete submersion water absorption is less than about 5 percent.

11. The foam article of claim 1, wherein the foam density is between about 0.40 grams/cubic centimeter and about 0.50 grams/cubic centimeter.
12. The foam article of claim 11, wherein the complete submersion water absorption is less than about 35 percent.
13. The foam article of claim 12, wherein the complete submersion water absorption is less than about 5 percent.
14. The foam article of claim 1, wherein the foam article is a microcellular material.
15. The foam article of claim 1, wherein the foam article has an average cell size less than about 100 microns.
16. The foam article of claim 1, wherein the foam article has an average cell size less than about 80 microns.
17. The foam article of claim 1, wherein the thermoplastic elastomer is a thermoplastic vulcanizate.
18. The foam article of claim 1, wherein the foam article is essentially free of residual chemical blowing agents or by-product of chemical blowing agent.
19. The foam article of claim 1, wherein the foam article is a gasket, a seal or a weatherstrip.
20. The foam article of claim 1, wherein the foam article is free of an auxiliary layer formed on a surface of the foam article that limits water absorption.
21. The foam article of claim 20, wherein the foam article is free of a co-extruded coating layer formed on a surface of the foam article that limits water absorption.

22. The foam article of claim 20, wherein the foam article is free of a hydrophobic coating layer formed on a surface of the foam article that limits water absorption.

23. The article of claim 1, wherein the foam article is substantially free of an acrylic modified PTFE.

24. The article of claim 1, wherein the foam article has a U-test water absorption of less than or equal to 0.5%.

25. A foam article comprising a thermoplastic elastomer and having a complete submersion water absorption of less than or equal to $40 \times [(1 - A)/A]$, wherein A= foam density in grams/cubic centimeter, the thermoplastic elastomer including a thermoplastic phase comprising a first polymer type,
the foam article being substantially free of a melt strength enhancing additive having a different polymer type than the first polymer type.

26. The foam article of claim 25, wherein the complete submersion water absorption is less than or equal to about $25 \times [(1 - A)/A]$.

27. The foam article of claim 25, wherein the complete submersion water absorption is less than or equal to about $10 \times [(1 - A)/A]$.

28. The foam article of claim 25, wherein the complete submersion water absorption is less than or equal to about $5 \times [(1 - A)/A]$.

29. The foam article of claim 25, wherein the foam density is between about 0.30 grams/cubic centimeter and about 0.70 grams/cubic centimeter.

30. The foam article of claim 29, wherein the complete submersion water absorption is less than about 35 percent.

31. The foam article of claim 29, wherein the complete submersion water absorption is less than about 5 percent.

32. The foam article of claim 25, wherein the foam density is between about 0.40 grams/cubic centimeter and about 0.50 grams/cubic centimeter.
33. The foam article of claim 25, wherein the foam article is a microcellular material.
34. The foam article of claim 25, wherein the foam article has an average cell size less than about 100 microns.
35. The foam article of claim 25, wherein the foam article has an average cell size less than about 80 microns.
36. The foam article of claim 25, wherein the thermoplastic elastomer is a thermoplastic vulcanizate.
37. The foam article of claim 25, wherein the foam article is free of an auxiliary layer formed on a surface of the foam article that limits water absorption.
38. The foam article of claim 37, wherein the foam article is free of a co-extruded coating layer formed on a surface of the foam article that limits water absorption.
39. The foam article of claim 37, wherein the foam article is free of a hydrophobic coating
layer formed on a surface of the foam article that limits water absorption.
40. The foam article of claim 25, wherein the foam article has a U-test water absorption of less than or equal to 0.5%.
41. A foam article comprising a thermoplastic elastomer and having a complete submersion water absorption of less than or equal to $40 \times [(1 - A)/A]$, wherein A= foam density in grams/cubic centimeter,
the foam article being substantially free of a melt strength enhancing additive comprising fluorine and being free of an auxiliary layer formed on a surface of the foam article that limits water absorption.

42. The foam article of claim 41, wherein the foam article is free of a co-extruded coating layer formed on a surface of the foam article that limits water absorption.
43. The foam article of claim 41, wherein the foam article is free of a hydrophobic coating layer formed on a surface of the foam article that limits water absorption.
44. The foam article of claim 41, wherein the complete submersion water absorption is less than or equal to about $25 \times [(1 - A)/A]$.
45. The foam article of claim 41, wherein the complete submersion water absorption is less than or equal to about $5 \times [(1 - A)/A]$.
46. The foam article of claim 41, wherein the foam density is between about 0.30 grams/cubic centimeter and about 0.70 grams/cubic centimeter.
47. The foam article of claim 46, wherein the complete submersion water absorption is less than about 35 percent.
48. The foam article of claim 46, wherein the complete submersion water absorption is less than about 5 percent.
49. The foam article of claim 41, wherein the foam article has a U-test water absorption of less than or equal to 0.5%.
50. A foam article comprising a thermoplastic elastomer and having a complete submersion water absorption of less than or equal to $40 \times [(1 - A)/A]$, wherein A= foam density in grams/cubic centimeter, the thermoplastic elastomer including a thermoplastic phase comprising a first polymer type,
the foam article being substantially free of a melt strength enhancing additive comprising a different polymer type than the first polymer type and being free of an auxiliary layer formed on a surface of the foam article that limits water absorption.

51. The foam article of claim 50, wherein the foam article is free of a co-extruded coating layer formed on a surface of the foam article that limits water absorption.
52. The foam article of claim 50, wherein the foam article is free of a hydrophobic coating layer formed on a surface of the foam article that limits water absorption.
53. The foam article of claim 50, wherein the complete submersion water absorption is less than or equal to about $25 \times [(1 - A)/A]$.
54. The foam article of claim 50, wherein the complete submersion water absorption is less than or equal to about $5 \times [(1 - A)/A]$.
55. The foam article of claim 50, wherein the foam density is between about 0.30 grams/cubic centimeter and about 0.70 grams/cubic centimeter.
56. The foam article of claim 55, wherein the complete submersion water absorption is less than about 35 percent.
57. The foam article of claim 55, wherein the complete submersion water absorption is less than about 5 percent.
58. The foam article of claim 50, wherein the foam article has a U-test water absorption of less than or equal to 0.5%.
59. A method comprising:
processing polymeric material comprising a thermoplastic elastomer in an extruder;
and
introducing a blowing agent comprising nitrogen into the polymeric material in the extruder.
60. The method of claim 59, wherein the polymeric material is a thermoplastic vulcanizate.

61. The method of claim 59, wherein the blowing agent consists essentially of nitrogen.
62. The method of claim 59, wherein the blowing agent comprises nitrogen and at least one second gas.
63. The method of claim 59, wherein the second gas is carbon dioxide.
64. The method of claim 59, wherein the polymeric material is essentially free of residual chemical blowing agent or by-product of chemical blowing agent.
65. The method of claim 59 further comprising extruding a foam article.
66. The method of claim 65, wherein the foam article is a microcellular material.
67. The method of claim 65, wherein the foam article has an average cell size of less than about 100 microns.
68. The method of claim 65, wherein the foam article has an average cell size of less than about 80 microns.
69. The method of claim 65, wherein the foam article having a complete submersion water absorption of less than or equal to $40 \times [(1 - A)/A]$, wherein A= foam density in grams/cubic centimeter.
70. The method of claim 65, wherein the foam article having a complete submersion water absorption of less than or equal to $25 \times [(1 - A)/A]$.
71. The method of claim 65, wherein the foam article having a complete submersion water absorption of less than or equal to $5 \times [(1 - A)/A]$.
72. A method comprising:
extruding a thermoplastic elastomer foam material from polymer extrusion apparatus using a blowing agent that is a gas under ambient conditions and recovering material having a

complete submersion water absorption of less than or equal to $40 \times [(1 - A)/A]$, wherein A= foam density in grams/cubic centimeter.

73. The method of claim 72, wherein the complete submersion water absorption is less than or equal to about $25 \times [(1 - A)/A]$.

74. The method of claim 72, wherein the complete submersion water absorption is less than or equal to about $10 \times [(1 - A)/A]$.

75. The method of claim 72, wherein the complete submersion water absorption is less than or equal to about $5 \times [(1 - A)/A]$.

76. A foam article comprising a thermoplastic elastomer and having a U-test water absorption of less than or equal to 0.5%, the foam article being substantially free of a melt strength enhancing additive comprising fluorine and being free of an auxiliary layer formed on a surface of the foam article that limits water absorption.

77. The foam article of claim 76, wherein the U-test water absorption is less than or equal to 0.3%.

78. The foam article of claim 76, wherein the U-test water absorption is less than or equal to 0.1%.

79. The foam article of claim 76, wherein the U-test water absorption is less than or equal to 0.05%.

80. The foam article of claim 76, wherein the foam article has an average cell size less than about 100 microns.

81. The foam article of claim 76, wherein the foam article has an average cell size less than about 80 microns.

82. The foam article of claim 76, wherein the thermoplastic elastomer is a thermoplastic vulcanizate.

83. The foam article of claim 82, wherein the thermoplastic vulcanizate comprises polypropylene and fully cross-linked EPDM.
84. The foam article of claim 76, wherein the foam article is essentially free of residual chemical blowing agents or by-product of chemical blowing agent.
85. The foam article of claim 76, wherein the foam article is a gasket, a seal or a weatherstrip.
86. The foam article of claim 76, wherein the foam article is free of a co-extruded coating layer formed on a surface of the foam article that limits water absorption.
87. The foam article of claim 76, wherein the foam article is free of a hydrophobic coating layer formed on a surface of the foam article that limits water absorption.
88. The foam article of claim 76, wherein the foam article is substantially free of an acrylic modified PTFE.
89. The foam article of claim 76, wherein the thermoplastic elastomer has a durometer of less than 60 Shore A.
90. The foam article of claim 76, wherein the thermoplastic elastomer has a durometer of less than 45 Shore A.
91. The foam article of claim 76, wherein the foam article has a complete submersion water absorption of less than or equal to $40 \times [(1 - A)/A]$, wherein A= foam density in grams/cubic centimeter.
92. A foam article comprising a thermoplastic elastomer having a U-test water absorption of less than or equal to 0.5%, the thermoplastic elastomer including a thermoplastic phase comprising a first polymer type,

the foam article being substantially free of a melt strength enhancing additive comprising a different polymer type than the first polymer type and being free of an auxiliary layer formed on a surface of the foam article that limits water absorption.

93. The foam article of claim 92, wherein the U-test water absorption is less than or equal to 0.3%.

94. The foam article of claim 92, wherein the U-test water absorption is less than or equal to 0.1%.

95. The foam article of claim 92, wherein the U-test water absorption is less than or equal to 0.05%.

96. The foam article of claim 92, wherein the foam article has an average cell size less than about 100 microns.

97. The foam article of claim 92, wherein the foam article has an average cell size less than about 80 microns.

98. The foam article of claim 92, wherein the thermoplastic elastomer is a thermoplastic vulcanizate.

99. The foam article of claim 98, wherein the thermoplastic vulcanizate comprises polypropylene and fully cross-linked EPDM.

100. The foam article of claim 92, wherein the foam article is essentially free of residual chemical blowing agents or by-product of chemical blowing agent.

101. The foam article of claim 92, wherein the foam article is a gasket, a seal or a weatherstrip.

102. The foam article of claim 92, wherein the foam article is free of a co-extruded coating layer formed on a surface of the foam article that limits water absorption.

103. The foam article of claim 92, wherein the foam article is free of a hydrophobic coating layer formed on a surface of the foam article that limits water absorption.

104. The foam article of claim 92, wherein the thermoplastic elastomer has a durometer of less than 60 Shore A.

105. The foam article of claim 92, wherein the thermoplastic elastomer has a durometer of less than 45 Shore A.

106. The foam article of claim 92, wherein the foam article has a complete submersion water absorption of less than or equal to $40 \times [(1 - A)/A]$, wherein A= foam density in grams/cubic centimeter.

107. A method comprising:
processing a thermoplastic elastomer having a durometer of less than 60 Shore A in an extruder;
introducing a physical blowing agent into the polymeric material to form a mixture of physical blowing agent and polymeric material in the extruder;
extruding the mixture of physical blowing agent and polymeric material to form an extrudate; and
forming a gasket, seal or weatherstrip from the extrudate.

108. A method comprising:
extruding a thermoplastic elastomer foam material from polymer extrusion apparatus; and
recovering a foam article comprising the thermoplastic elastomer having a U-test water absorption of less than or equal to 0.5%, the foam article being substantially free of a melt strength enhancing additive comprising fluorine and being free of an auxiliary layer formed on a surface of the foam article that limits water absorption.

109. A method comprising:
extruding a thermoplastic elastomer foam material from polymer extrusion apparatus; and

recovering a foam article comprising the thermoplastic elastomer having a U-test water absorption of less than or equal to 0.5%, the thermoplastic elastomer including a thermoplastic phase comprising a first polymer type, the foam article being substantially free of a melt strength enhancing additive comprising a different polymer type than the first polymer type and being free of an auxiliary layer formed on a surface of the foam article that limits water absorption.